

THE MINERAL INDUSTRY OF SPAIN

By Harold R. Newman

Spain, which has some of the most mineralized territory in Western Europe, was a significant European producer of nonferrous and precious metals. The main polymetallic deposits, from west to east, include Tharsis, Scotiel, Rio Tinto, and Aznalcollar. In terms of value of metallic and nonmetallic minerals and quarry products, Spain was a leader among the European Union (EU) countries. Consequently, Spain had one of the highest levels of self-sufficiency with respect to mineral raw materials among the EU members. Of the approximately 100 mineral products mined, only about 18 were produced in significant quantities—bentonite, copper, fluorspar, glauconite, gold, iron, lead, magnetite, mercury, potassic pyrites, quartz, refractory argillite, sea and rock salt, sepiolitic salts, tin, tungsten, and zinc.

Production of many metallic minerals in Spain was insufficient to meet domestic demand, so these must be imported. For most nonmetallic minerals, however, production far exceeded domestic consumption, and, thus, surpluses were exported. The economic development of certain areas, such as the Asturias and Basque regions, was based on their mineral wealth, and mining continued to be an important current (1998) and potential source of income in these and other areas.

With a few exceptions, mine production continued at about the same level as that of 1997. (See table 1.) Of the major metals, the only commodity with a significant increase in metal production was gold. Production of iron ore, lead, silver, and zinc decreased. Total refined copper production increased. Lead metal output dropped slightly. Primary aluminum metal production stayed about the same. The mercury mines at Almadén decreased production levels from 1997.

Among industrial minerals, fluorspar production remained nearly constant, and magnesite and potash production decreased. Quarried mineral products, particularly quarried stone, accounted for a significant share of the value of all mineral production in Spain. In mineral fuels and related materials, natural gas output declined, and petroleum output increased.

Trade flows were liberalized after Spain joined the EU and the differences between Spanish tariffs and EU Common Market tariffs were significantly reduced. The only mineral-related commodities in which Spain was a net exporter to other EU countries in 1998, thereby reducing its trade deficit, were lead, mercury, nonmetallic mineral manufactured products, slate and other crude industrial minerals, and zinc.

Spain was one of the larger coal producers in the EU, with an output of about 26 million metric tons per year (Mt/yr) of all types. Coal reserves are abundant but difficult to mine. Consequently, cost of production was high, making Spanish coal less competitive than that of many other countries. The leading producer of soft coal was Huelleras del Norte S.A., and the leading producer of lignite was Empresa Nacional de

Electricidad S.A. (Endesa). The country continued to be a large importer of mineral fuels. Spain's production of crude oil was limited.

The mineral industry comprised a mix of state and privately owned companies. Minerals belong to the state under an arrangement known as the *Regalía Principal*. The Mining Law of July 19, 1944, as amended, and the Hydrocarbon Law of December 26, 1950, govern the mineral industry. The Ministerio de Industria y Energía (Ministry of Industry and Energy) implements the mineral laws, regulates the private sector, and manages most of the state-owned companies through the Instituto Nacional de Industria (INI), a state holding company. INI and Instituto Geológico y Minero are the principal Government mineral-resource agencies. (See table 2.)

Alumina and primary aluminum were produced almost entirely by the Industria Española del Aluminio S.A. (Inespal). Inespal was a holding company with four operating subsidiaries—Aluminio Español S.A., Inespal Extrusión S.A., Inespal Conversión S.A., and Inespal Productos Planos S.A. INI was Inespal's major shareholder. Alúmina Española S.A., a subsidiary near San Ciprián, produced alumina, primary aluminum in standard sheets and ingots, and special alloys.

Essex Resources Corp. of Canada reported results of its preliminary study on the Calatrava cobalt-manganese project in south-central Spain. Of the three permitted exploration areas of about 700 square kilometers (km²), Ciudad Real contains at least six cobalt-bearing deposits with manganese indicated as a significant byproduct. Total estimated inferred reserves were more than 4 million metric tons (Mt) of 0.13% cobalt and 4.4% manganese (Metal Bulletin, 1998a).

The Essex study proposed a mine with a capacity of 100,000 metric tons per year (t/yr) of concentrates. Development costs were estimated to be about \$24 million. Metallurgical recoveries were anticipated to be 85% to 95% for cobalt and manganese. The mineralization at Canabrava would be amenable to open-cut and back-fill mining. Average overburden depth is 6.1 meters (m) (Metal Bulletin, 1998a).

Copper was mined mainly at the deposits in Sotiel and Migollas in Huelva by Navan Resources Ltd. (Almagrera). Navan reported that it would debt-finance the expansion of its Spanish mining and metallurgical operations. Barclays Bank Plc. agreed in principal to provide funding for the first phase of the development of a new copper-lead-zinc mine at Aguas Teñidas; Navan Resources inaugurated its new polymetallic (copper, lead, and zinc) Aguas Teñidas Mine near Huelva in November 1997. Aguas Teñidas was the first underground operation to be developed in Spain in several years. The operation was expected to be fully operational by 2000 and would supply Navan's nearby Almagrera mill and concentrator with 800,000 t/yr to 1 Mt/yr of ore (Metal Bulletin, 1998e).

Rio Tinto Minera S.A.'s Spanish exploration subsidiary, Riomin Exploraciones S.A., was continuing feasibility studies on its Las Cruces copper mineralization discovery in Andalusia. The Las Cruces deposit is located about 15 kilometers north of Seville within the Iberian Pyrite belt.

Ferroatlántica SL acquired the operating assets of ferrosilicon (FeSi) producer Fesilven CA, located in Puerto Ordaz, Venezuela, for \$20 million in a privatization sale. The company had four furnaces and produced FeSi 75% and silicon metal mainly for export (Metal Bulletin, 1998b).

Production started at Spain's newest gold mine—Rio Narcea Gold Mines Ltd.'s open pit El Valle Mine near Salas in Asturias, northern Spain. Although still in the commissioning phase, the 600,000-t/yr plant was operating at design capacity, and 95% gold recovery was being achieved. The first gold concentrate from the gravity and flotation circuits was obtained in February, and the carbon-in-leach section of the plant was also operational, with the first elution and gold pour taking place on February 25, 1998. The three open pits at El Valle contain estimated proven and probable reserves of 4.8 Mt of ore with an average grade of 5.3 grams per metric ton (g/t) gold. Production was expected to average 3,000 kilograms per year (kg/yr) over 8 years (Mining Journal, 1998b).

Underground production from the Black Skarn deposit at El Valle was being considered, and a development ramp was expected to begin in 1999. This, together with ore from the Carles deposit, would require an expansion of the plant's capacity to 4,500 kg/yr of gold. Black Skarn was a higher graded deposit possessing estimated potential minable reserves of at least an additional 4.8 Mt averaging 6.4 g/t gold (Mining Journal, 1998b).

Rio Narcea had exploration permits in Spain covering 4.2 million square kilometers (Mkm²) and concessions and investigation permits covering about 2.3 Mkm². Rio Narcea had exploration targets in the Navelgas and Oscos gold belts in northern Spain and also in the Malpica gold belt in Galicia, northwestern Spain, where its most recent acquisition is the Corcoesto project (Mining Journal, 1998b).

East Daggafontein Mines Ltd. (EDM) of South Africa reported results of stream sediment and channel sample assays from the Serrata gold prospect in southeastern Spain. The assays returned grades of up to 8.3 g/t gold over 7 m, 5.1 g/t gold over 4 m, and 1.4 g/t gold over 15.6 m, at an average assay result of 0.6 g/t gold over 0.8 km². The Serrata project was a joint venture between EDM and Serrata Gold Mining Co. of Spain and covered approximately 360 km² (Mining Journal, 1998a).

A principal producer of iron ore was Compañía Andaluza de Minas S.A. (CAM), which had worked its open pit mine at Marzuesado (Granada). Mining was halted in October 1996, and the mine remained inactive at yearend 1998. Ongoing attempts to resurrect the mine were hindered by flooding. Instituto de Formento de Andalucía yielded 90% of its stake in CAM to the former mining staff, which planned to buy the other 10%. Before its closure, the mine's capacity had shrunk to about 1.5 Mt/yr. CAM exported 43,225 metric tons (t) of fine ore in 1997 compared with 975,354 t in 1996 (Metal Bulletin, 1998d).

Production started in 1997 at Boliden S.A.'s Los Frailes Mine, one of the biggest open pit zinc mines in Europe. However, the mine was closed in early 1998 after a large toxic spill. A waste

reservoir dam ruptured as a result of an earthslide in bedrock 14 m below the original surface topography. The accident reportedly resulted from the lateral movement of more than 60 m of a 700-m section of the dam along a bedding plane in what is called the Margas Azules (Blue Clay) formation. The dam was originally projected to store a volume of 32.6 million cubic meters (Mm³) of tailings and to reach a maximum height of 32 m above the surface topography. At the time of the accident, 15 Mm³ of tailings had been stored, and the dam was at a height of 28 m (Engineering and Mining Journal, 1998).

Boliden reopened Los Frailes Mine at yearend 1998. The main delay in the restart was the need to establish an alternate site at which to dump the tailings. The open pit of the closed Aznalcollar Mine was being used to dispose of waste from the cleanup, and Boliden was investigating whether the pit could be used for dumping tailings on a long-term basis. In 1998, prior to the spill, Los Frailes had been expected to produce about 240,000 t of zinc concentrates grading 8% zinc, 90,000 t of lead concentrates grading 8% lead, and 30,000 t of copper concentrates grading 20% copper (Metal Bulletin, 1998c).

Bruno S.A., which concentrated on supplying celestite to major producers of strontium carbonate in Europe, was developing a new plant for the processing of celestite at its Montevive quarry operation. The company was also installing new laboratory equipment to prepare celestite for the oil industry to be used in oil- and water-based drilling.

Caustic calcined grades of magnesite were produced in Spain for nonrefractory markets, and crude magnesite was produced from deposits at Eugui, Navarra, and used to make magnesia-based refractory bricks. Output of both has been trending upward in the 1990's. The increase in crude magnesite production reflects improvements in the steel industry, where refractory bricks are used to line furnaces.

The Dead Sea Works Ltd. (DSW) consortium was the successful bidder for potash producer Grupo Potasas in a two-stage \$206 million investment package. The consortium consists of DSW (60%), La Seda de Barcelona S.A. (20%), and Tolsa S.A. (20%). The acquisition was part of the strategy to expand production capabilities by acquiring holdings in potash production facilities worldwide. The two operating companies of the former Grupo Potasas were Suria K S.A. and Potasas de Lobregat S.A. Both operations mine sylvanite and sylvite ore from what is essentially the same Cataluña deposit. Estimated combined reserves were 123 Mt potassium chloride (Industrial Minerals, 1998).

The \$7.6 billion market privatization of Endesa, the energy group, set a new benchmark for domestic equity distribution in Spain. The sale was the last big sale by the Spanish Government and increased the group's shareholder base from 1.6 million to more than 2.5 million domestic investors, the biggest total for a company listed on Madrid's Bolsa de Valores. The offering was made by the state holding company Sepi, which sold its 33% stake in Endesa (Burns, 1998).

Production of lignite by Endesa increased slightly from that of 1997. All the lignite produced was used to generate electricity. The Government signed an agreement with coal industry trade unions that was expected to cut almost 30% of the work force and public funding in the next 7 years. According to the plan, 7,000 of the current (1998) 24,400 jobs will be lost, and there

would be progressive cuts in public aid. The Government stated that the plan provided the necessary restructuring of the mining sector while meeting EU requirements and reducing taxpayers' costs of sustaining the sector. The Government expected that as much as \$2.3 billion could be appropriated during the next several years to provide redevelopment aid for northern coal mining regions. A European Coal and Steel Community treaty, set to expire in 2002, allowed Spain to continue subsidizing its coal market but called for the country to liberalize it and to reduce aid and production in this sector. That these conditions had not been met was a source of controversy within the EU (Coal Age, 1998).

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Major Sources of Information

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Ministerio de Industria y Energía
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TABLE I
SPAIN: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1994	1995	1996	1997	1998 e/
METALS					
Aluminum:					
Alumina 2/	1,070,600	1,070,580	1,094,797	1,110,300	1,100,000
Metal:					
Primary	338,106	361,100	361,829	359,904	360,400
Secondary	103,500	106,975	153,837	153,800 r/	154,000
Cadmium metal	387	397	307	301 r/	196 3/
Copper:					
Mine output, Cu content	5,944 r/	22,614	38,392 r/	37,833 r/	37,000
Metal:					
Blister: e/					
Primary	141,600	134,300	248,500	288,900	300,000
Secondary	46,800	47,100	22,400	23,800	30,000
Total	188,400	181,400	270,900	312,700	330,000
Refined:					
Primary	132,300 r/	117,100	210,000	228,710	304,000
Secondary	56,000 r/	47,100	54,000	63,300	65,000
Total	188,300 r/	164,200	264,000	292,010	369,000
Germanium oxide, Ge content	kilograms	3,950	4,145	6,478	6,500
Gold, mine output, Au content	do.	5,852	4,131	2,832 r/	1,824
Iron and steel:					
Iron ore and concentrates, Fe content	thousand tons	2,086	960	588	58
Metal:					
Pig iron	do.	5,447	5,128	4,127	3,926
Ferroalloys, electric furnace	do.	1,000 r/	1,200 r/	1,392 r/	1,650 r/
Steel:					
Crude	do.	13,547	13,975	12,038	13,644
Castings and forgings	do.	175	121	123	125 e/
Total		13,722	14,096	12,161	13,769 r/
Semimanufactures	do.	12,103	13,175	11,647	12,421
Lead:					
Mine output, Pb content		23,573	30,077	23,826	23,900
Metal: e/					
Primary		70,400	--	--	--
Secondary		69,600	80,000	86,000	74,900
Mercury, metal	thousand tons	393	1,497	862	863
Silver, mine output, Ag content	kilograms	195,754	123,615	108,901 r/	66,000
Tantalum minerals (tin byproduct): e/					
Gross weight		5,000	--	--	--
Ta content		1,200	--	--	--
Tin:					
Mine output, Sn content		4,452 r/	2,047	1,917	4,000 r/
Metal, primary e/		200 r/	100 r/	-- r/	--
Titanium dioxide e/		20,000	20,000	18,000	18,000
Uranium, mine output, U ₃ O ₈ content	thousand tons	301	420	424	425
Zinc:					
Mine output, Zn content		150,422	172,468	139,589 r/	171,800 r/
Metal, primary and secondary		298,700	346,100 r/	360,800	364,200
INDUSTRIAL MINERALS					
Barite		28,037	28,600	28,000	28,000
Bromine e/		200	200	100	100
Calcium carbonate e/		1,600	1,600	1,650	1,750
Cement, hydraulic, other than natural	thousand tons	25,131	26,423	25,157	27,632
Clays:					
Attapulgit		91,124 r/	94,266	130,140 r/	125,000 r/ e
Bentonite		179,233 r/	172,265	151,155 r/	170,000 e/
Kaolin, washed		290,000	316,074	317,918 r/	296,000 r/
Other e/	thousand tons	13,650	25,300	15,000	20,000
Diatomite and tripoli		34,243 r/	44,623 r/	34,492 r/	36,000 r/ e
Feldspar		250,000	379,284	415,189 r/	398,000 r/
Fluorspar:					
Acid-grade		97,000	108,205	109,085	110,000 e/
Metallurgical-grade		10,000	10,206	7,441	10,000 e/
Total		107,000	118,411	116,526	120,000 e/
Gypsum and anhydrite, crude	thousand tons	6,484 r/	7,495	8,191 r/	8,300 r/
Kyanite, andalusite, related materials e/		3,500	2,000	2,000	2,500
Lime, hydrated and quicklime e/	thousand tons	1,000	1,500	1,500	1,500
Magnesite:					
Calcined e/		135,000 3/	150,000	150,000	170,000
Crude		400,000 e/	491,397	483,726 r/	500,000 e/
Mica		1,797 r/	2,628 r/	2,507 r/	2,500 r/
Nitrogen, N content of ammonia	thousand tons	452	453	466	497
Pigments, mineral: e/					
Ocher		8,000	7,000	8,000	8,000
Red iron oxide		16,000	15,000	15,000	15,000

See footnotes at end of table.

TABLE 1--Continued
SPAIN: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1994	1995	1996	1997	1998 e/
INDUSTRIAL MINERALS--Continued					
Potash, K ₂ O equivalent	679,954 r/	759,923	717,064 r/	639,000 r/	585,000 3/
Pumice e/	700,000	700,000	700,000	600,000	
Pyrite, including cuprous, gross weight	746	875	1,042	993	868 3/
Salt:					
Rock, including byproduct from potash work:	do.	2,850	2,215	2,216 r/	2,200 e/
Marine and other	do.	850	1,471	1,220 r/	1,400 e/
Sand and gravel, silica sand e/ 4/	do.	2,000	5,105	5,300	6,200
Sepiolite e/	375,000	375,000	761,596 r/ 3	750,000 r/	750,000
Sodium compounds, n.e.s.:					
Soda ash, manufactured e/	thousand tons	500	500	500	500
Sulfate, natural:					
Glauberite, Na ₂ SO ₄ content	572,159 r/	637,525	667,177 r/	650,000 r/	650,000
Thenardite, Na ₂ SO ₄ content	169,349 r/	175,717 r/	187,746 r/	180,000 r/ e	180,000
Manufactured e/	150,000	150,000	100,000	125,000	125,000
Stone: e/					
Chalk	thousand tons	400	136	140	140 r/
Dolomite	do.	4,400	4,608 3/	5,100	5,400
Limestone	do.	1,450	2,326 3/	2,400	2,500
Marble	do.	2,132 3/	2,151 r/ 3	2,347 r/	2,400
Marl	do.	5,000	5,145 3/	8,500 r/	8,950 r/
Basalt	do.	4,500	1,195 3/	1,200	1,400
Granite	do.	1,338	1,375 r/ 3	1,295 r/ 3	1,400
Ophite	do.	2,500	2,165 3/	2,200	2,200
Phonolite	do.	600	677 3/	650	650
Porphyry	do.	500	783	800	800
Quartz	do.	1,500	1,445 3/	1,438 r/	1,520 r/
Quartzite	do.	2,000	2,255 3/	2,200	2,400
Sandstone	do.	1,500	2,629 3/	2,600	2,500
Serpentine	do.	900	979	900	900
Slate	do.	500	551	705	555
Other	do.	600	619	1,134 r/ 3	1,000 r/
Strontium minerals, Sr ₂ O ₄ content e/	95,535 r/	105,868 r/	114,829 r/	92,000 r/	95,000
Sulfur:					
S content of pyrites	thousand tons	342 r/	403	439 r/	480
Byproduct: e/					
Of metallurgy	do.	269 r/	282 r/	420 r/	250
Of petroleum	do.	160 r/	160 r/	250 r/	150
Of coal (lignite) gasification	do.	2	2	1 r/	2
Total sulfur	do.	773 r/	847 r/	1,110 r/	882 r/
Talc and steatite	80,606 r/	112,341 r/	109,756 r/	110,000 r/ e	110,000
MINERAL FUELS AND RELATED MATERIALS					
Coal (marketable):					
Anthracite	thousand tons	6,756	6,275	6,487	6,678
Bituminous	do.	12,000	11,425	7,195 r/	7,200 e/
Lignite (black and brown)	do.	15,499	10,776	9,604	12,577
Total	do.	34,255	28,476	23,286 r/	26,455
Coke, metallurgical	do.	3,000 e/	2,438	2,403 r/	2,622 r/
Gas, natural (marketed)	million cubic meters	197	422	466	178
Peat e/	70,000	70,000	50,000	60,000	50,000
Petroleum:					
Crude	thousand 42-gallon barrels	5,879	4,747	3,846 r/	2,850 r/
Refinery products:					
Liquefied petroleum gas	do.	19,848	21,019	17,655	18,954 r/
Naphtha	do.	19,006	12,900	19,797	22,899 r/
Gasoline, motor	do.	84,388	82,544	83,113	78,497 r/
Jet fuel	do.	29,192	32,064	33,504	33,000
Kerosene	do.	29,249	12,555	15,000 r/	20,000 r/
Distillate fuel oil	do.	121,695	124,097	129,080	138,249 r/
Residual fuel oil	do.	94,912	80,366	73,213	77,276 r/
Other e/	do.	30,000	52,696	50,624	35,476 r/
Refinery fuel and losses e/	do.	12,000	13,531	12,026	12,000
Total e/	do.	440,290	431,772	434,012 r/	436,351 r/

e/ Estimated. r/ Revised.

1/ Table includes data available through July 1999.

2/ Reflects aluminum hydrate.

3/ Reported figure.

4/ Includes sand obtained as a byproduct of feldspar and kaolin production.

TABLE 2
SPAIN: STRUCTURE OF THE MINERAL INDUSTRY IN 1998

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity	
Alumina	Alúmina Española S.A.	Alumina plant at San Ciprián, Lugo	1,000	
Aluminum	Aluminio Español S.A.	Electrolytic plant at San Ciprián, Lugo	180	
Do.	Industria Española del Aluminio, S.A. (Inespal)	Electrolytic plant at Avilés	100	
Do.	do.	Electrolytic plant at La Coruña	25	
Do.	Aluminio de Galicia S.A.	Electrolytic plant at Sabiñánigo	78	
Do.	do.	do.	14	
Coal:				
Anthracite	Antracitas Gaiztarro S.A.	Mines at María and Paulina	2,000	
Do.	Antracitas de Gillón S.A.	Mines near Oviedo	2,000	
Do.	Antracitas del Bierzo S.A.	Mines near León	1,000	
Bituminous	Huelleras del Norte S.A. (Hunosa)	Various mines and plant	3,300	
Do.	Huelleras Vasco Leonesa S.A.	Santa Lucia Mine, León	2,000	
Do.	Minas de Figaredo S.A.	Mines near Oviedo	1,000	
Do.	Nacional de Carbon del Sur (Encasur)	Rampa 3 and San José Mines, Córdoba	200	
Lignite	Empresa Nacional de Electricidad S.A. (Endesa)	As Pontes Mine, and Andorra Mine, La Coruña	15,000	
Barite	Minas de Baritina S.A. (Kali-Chemie of Germany, 100%)	Mine and plant in Espiel area, Córdoba	50	
Cement	Approximately 36 cement companies, of which the largest is: Asland S.A.	54 plants, including 5 (Asland) plants, of which the largest ones are plants at Puerto de Sagunto, Valencia, and at Villaluenga de la Sagra, Toledo	44,000 (6,000) 2,000 2,000	
Copper:				
Metal	Atlantic Copper Holding S.A. (Freeport MacMoRan Inc., 65%; Ercros Group, 35%)	Refinery at Huelva	270	
Do.	do.	Electrolytic refinery at Huelva	105	
Do.	Electrolítico y Metales S.A.	Fire and electrolytic refinery at Asua-Bilboa	36	
Do.	Industrias Reunidas de Cobre	Smelter at Asua-Bilbao	30	
Ore, metal content	Atlantic Copper Holding, S.A. (Freeport MacMoRan Inc., 65%, Ercros Group, 35%)	Mines and plant at Ariertero, near Santiago de Compostela, Corta Atalay open pit mine, Cerro Colorado open pit mine and Alfredo underground mine, in Rio Tinto area	12 30	
Do.	Boliden (ASPIRSA) S.A.	Los Frailes Mine, Seville	30	
Do.	Navan Resources Ltd. (Almagrera)	Migolas and Sotiel areas	6	
Fluorspar, ore	Fluoruros S.A. (Bethlehem Steel Corp., 49%)	Plant at Caravia, near Colunga	400	
Do.	do.	Opencast mines at San Lino and Val Negro and underground mine at Eduardo, near Caravia	350	
Do.	do.	Plant at Collada, Gijón and mines at Veneros Sur and Corona, Gijón	200	
Gold	kilograms	Río Narcea Gold Mines, Ltd.	El Valle Mine, Salas, Asturias	3,000
Iron ore	Compañía Andaluza de Minas S.A. (Instituto de Formenta de Andalucía, 6%)	Mine at Alquife, Granada (Closed)	1,500	
Do.	Altos Hornos de Vizcaya S.A. (U.S. Steel, 25%)	Nine mines in Province of Vizcaya	4,000	
Do.	Compañía Minera Siderúrgica de Ponferrada S.A.	Eight mines in Province of León	3,000	
Do.	Minera del Andévalo S.A.	Opencast mine at Coba, Huelva	2,000	
Lead:				
Metal	Sociedad Minera y Metalúrgica de Peñarroya de España, S.A. (Peñarroya, France, 98%)	Smelter at Cartagena, Murcia	60	
Do.	do.	Refinery at Cartagena, Murcia	60	
Do.	Compañía La Cruz, Minas y Fundiciones de Plomo S.A.	Smelter at Lineares, Jaén	40	
Do.	Compañía La Cruz, Minas y Fundiciones de Plomo S.A.	Refinery at Lineares, Jaén	40	
Do.	Tudor S.A.	Secondary smelter at Saragoza	16	
Do.	Ferroaleaciones Españolas, S.A.	Secondary smelter at Medina del Campo	12	
Do.	Derivados de Minerales y Metales	Secondary smelter at Barcelona	5	
Ore	Sociedad Minera y Metalúrgica de Peñarroya España S.A. (Peñarroya, France 90%)	Opencast mine at Montos de Los Azules, near Unión Murcia	25	
Do.	Boliden (APIRSA) S.A.	Los Frailes Mine, Seville	100	
Do.	Exploración Minera Internacional España S.A. (EXMINESA)	Underground mine at Rubiales, Lugo	16	
Magnesite	Magnesitas de Rubián S.A.	Plants at Zubiri	100	
Do.	do.	Mines and plant near Sarria, south of Lugo	220	
Mercury	flasks	Minas de Almadén y Arrayanes S.A. (Government, 100%)	Mine and smelter at Almadén	70,000
Petroleum:				
Crude	barrels per day	Chevron S.A.	Oilfield at Casablanca	300
Refined	do.	Repsol Petróleo S.A.	Refineries at Escombreras	200,000
Do.	do.	do.	Puertollano	14,000
Do.	do.	do.	Tarragona	260,000
Do.	do.	Refinería de Petróleos del Norte S.A. (Petronor)	Refinery at Somorrostro	240,000
Do.	do.	Compañía Española de Petróleos S.A.	Refinery at Santa Cruz de Tenerife	160,000
Do.	do.	Petróleos del Mediterraneo S.A. (Petromed)	Refinery at Castellón de la Plana	120,000
Do.	do.	Compañía Ibérica Refinadora de Petróleos S.A. (Petroliber)	Refinery at La Coruña	140,000

TABLE 2--Continued
 SPAIN: STRUCTURE OF THE MINERAL INDUSTRY IN 1998

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Potash, ore	Potasas de Navarra S.A.	Mines and plant near Pamplona	300
Do.	Minas de Potasas de Suria S.A. (Dead Sea Works Ltd., 60%, La Seda de Barcelona S.A., 20%, Tolsa S.A., 20%)	Mines near Suria	500
Do.	Potasas de Lobregat S.A. (Dead Sea Works Ltd., 60%, La Seda de Barcelona S.A., 20%, Tolsa S.A., 20%)	do.	500
Pyrite	Compañía Española de Minas de Tharsis	Mines and plants at Tharsis and Zarza, near Seville	1,300
Do.	do.	Plant at Huelva	600
Do.	Rio Tinto Minera S.A. Unión Explosivos (Rio Tinto, 75%; Rio Tinto Zinc, 25%)	Mines and plant at Rio Tinto, near Seville	900
Sepiolite	Tolsa S.A.	Mine and plant at Vicalvaro, near Toledo	100
Do.	Silicatos-Anglo-Ingleses S.A.	Mine and plant at Vilecas near Madrid	200
Steel	Aceralia S.A. (Arbed Group, 35%, Aristran S.A., 11.2%.)	Plants at Avilés, Gijón, and Echévarri	3,300
Uranium, U ₃ O ₈	metric tons Empresa Nacional del Uranio (Enusa), (Government, 100%)	Mines and plant near Ciudad Real	500
Zinc:			
Metal	Asturiana de Zinc S.A. (Azsa), (Glencore International AG, 44%)	Electrolytic zinc plant at San Juan de Nieva	320
Ore	do.	Reocin mines and plants near Torrelavega, Santander	500
Do.	Boliden (APIRSA) S.A.	Los Frailes Mine, Seville	250
Do.	Exploración Minera Internacional España S.A. (EXMINESA)	Underground mine at Rubiales, Lugo	500
Do.	Sociedad Minera y Metalúrgica de Penarroya-España S.A.	Mines and plants at Montos de los Azules y Sierra de Lujar, San Agustín	200